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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|---|---|---|---|
| 10/719,897 | 11/21/2003 | Norimitsu Fukami | F-9(KC)/FP 1501 | 1430 |

26021 7590 03/08/2007

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| EXAMINER | |
|---|---|
| CHACKO DAVIS, DABORAH | |
| ART UNIT | PAPER NUMBER |
| 1756 | |

| SHORTENED STATUTORY PERIOD OF RESPONSE | MAIL DATE | DELIVERY MODE |
|---|---|---|
| 3 MONTHS | 03/08/2007 | PAPER |

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 10/719,897 | FUKAMI ET AL. | |
| | Examiner | Art Unit | |
| | Daborah Chacko-Davis | 1756 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *30 November 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-18* is/are pending in the application.

4a) Of the above claim(s) *1-8* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *9-18* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *03/04*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

## DETAILED ACTION

### *Election/Restrictions*

1. Applicant's election without traverse of Group II, claims 9-18, in the reply filed on November 30, 2006, is acknowledged. Claims 1-8, are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim.

### *Claim Rejections - 35 USC § 103*

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 9-18, are rejected under 35 U.S.C. 103(a) as being unpatentable over U. S. Patent No. 6,143,116 (Hayashi et al., hereinafter referred to as Hayashi) in view of U. S. Patent No. 6,159,322 (Ogata et al., hereinafter referred to as Ogata).

Hayashi, in the abstract, in col 2, lines 65-67, in col 3, lines 1-20, in col 7, lines 60-67, in col 8, lines 1-59, in col 13, lines 1-62, in col 15, lines 1-67, in col 16, lines 1-32, discloses a method of forming a multi-layer circuit board comprising forming a circuit pattern on a transfer sheet (transparent carrier film, the circuit pattern being non-transmitting), forming a slurry of photocurable material (the slurry containing an electrically insulating ceramic material such as an inorganic filler material) on the circuit patterned insulating board, and photocuring the slurry material by irradiation with light

via the back side of the transfer sheet, developing the non-cured portions (immersing in solution), adhering the insulating board with the circuit pattern to that of the circuit layer on the transfer sheet (or ceramic green sheet, with through holes filled with conducting paste) and laminating by pressing and heat curing (lamination done such that the transfer sheet and substrate are opposed to each other i.e., the circuitry face each other), repeating the process by preparing multiple insulating boards, in the method described above, with circuit patterns, and adhering the boards with transfer sheets comprising the wiring circuit layer, and laminating the circuit parts together by pressing and heat curing, followed by peeling the transfer sheets (see figures 2(A) through 2(D), and 4(D)) to form the multi-layer circuit laminate (claims 9-10, and 18). Hayashi, in col 6, lines 22-25, and in col 15, lines 40-60, discloses that the photocured ceramic sheet (insulating board with the wiring circuit pattern layer) can have total thickness not larger than 50μm (10μm insulating board+ 12μm copper foil thickness = 22μm), and the difference in thickness between the circuit pattern thickness and the insulating board (thickness difference between the circuit-forming pattern and the photo cured ceramic sheet) is less than 5μm i.e., 2μm (claim 11). Hayashi, in col 15, lines 41-56, discloses that the circuit-forming pattern (patterned wiring circuit layer) is an electrically conducting material such as a metal foil (claims 12, and 14). Hayashi, in col 7, lines 60-67, in col 8, lines 1-59, discloses that the insulating board can comprise conductive wiring that comprises a conductive paste made of a metal powder and an organic binder resin (claim 13). Hayashi, in col 7, lines 60-67, in col 8, lines 1-67, and in col 15, lines 42-60, discloses that the circuit forming pattern (circuit wiring) and the insulating board

composition (thermosetting resin, thermally curable i.e., thermally disintegrating resin or thermally extinguishing pattern) are so formed that the circuit wiring pattern and the thermosetting resin pattern (insulating board composition) forming a single layer of insulating board with circuit wiring in it and that they (circuit pattern and thermally extinguishing pattern) are not overlapped but rather embedded or buried in the layer (see figure 2(A)) (claims 15-16). Hayashi, in col 9, lines 24-37, and in figures 1, and 2(D), discloses that the surface roughness of the insulating board is not smaller than 1μm (i.e., surface roughness is not smaller than from 0.3 to 3μm), and that the laminate is formed with roughened surfaces opposing each other (claim 17).

The difference between the claims and Hayashi is that Hayashi does not disclose firing the laminate.

Ogata, in col 19, lines 19-25, discloses after the completion of the multi-layer circuit board laminate, the laminate is fired in a firing furnace.

Therefore, it would be obvious to a skilled artisan to modify Hayashi by employing the process of firing after lamination as suggested by Ogata because Ogata, in col 1, lines 6-15, and in col 19, lines 19-35, discloses that firing the laminate results in a multi-layer fired ceramic board with high density and enables an increase in the mechanical strength of the substrate in the multi-layer circuit board.

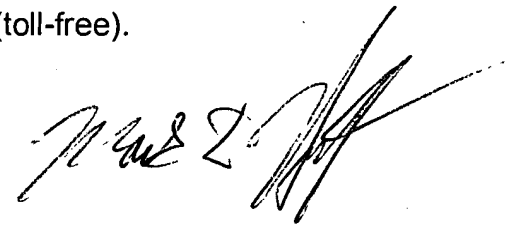
***Conclusion***

4. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Daborah Chacko-Davis whose telephone number is (571) 272-1380. The examiner can normally be reached on M-F 9:30 - 6:00. If

attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark F Huff can be reached on (571) 272-1385. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

dcd

February 26, 2007.



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